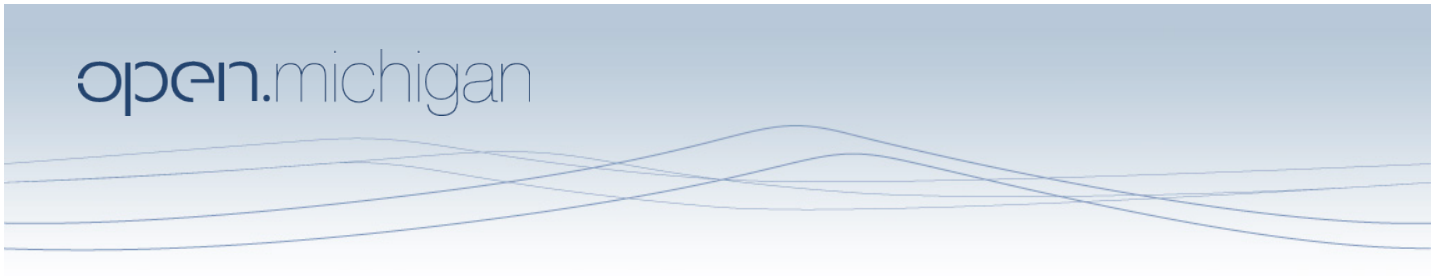
Google Application Engine

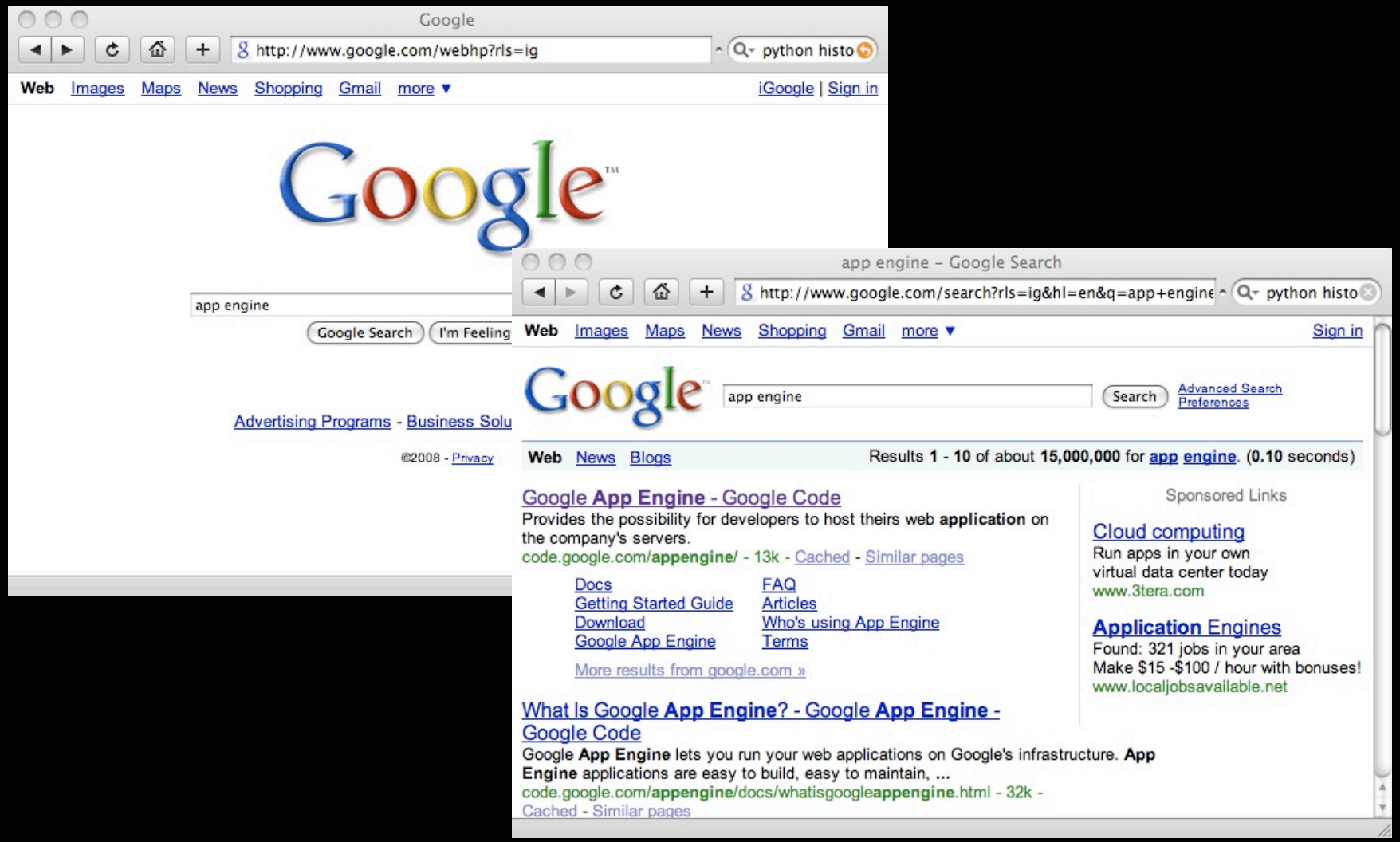
Introduction

Charles Severance

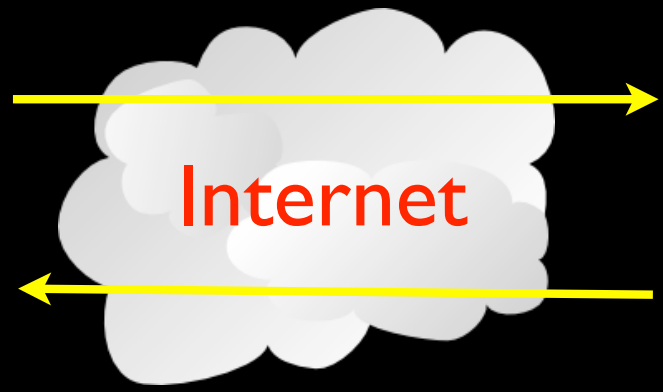


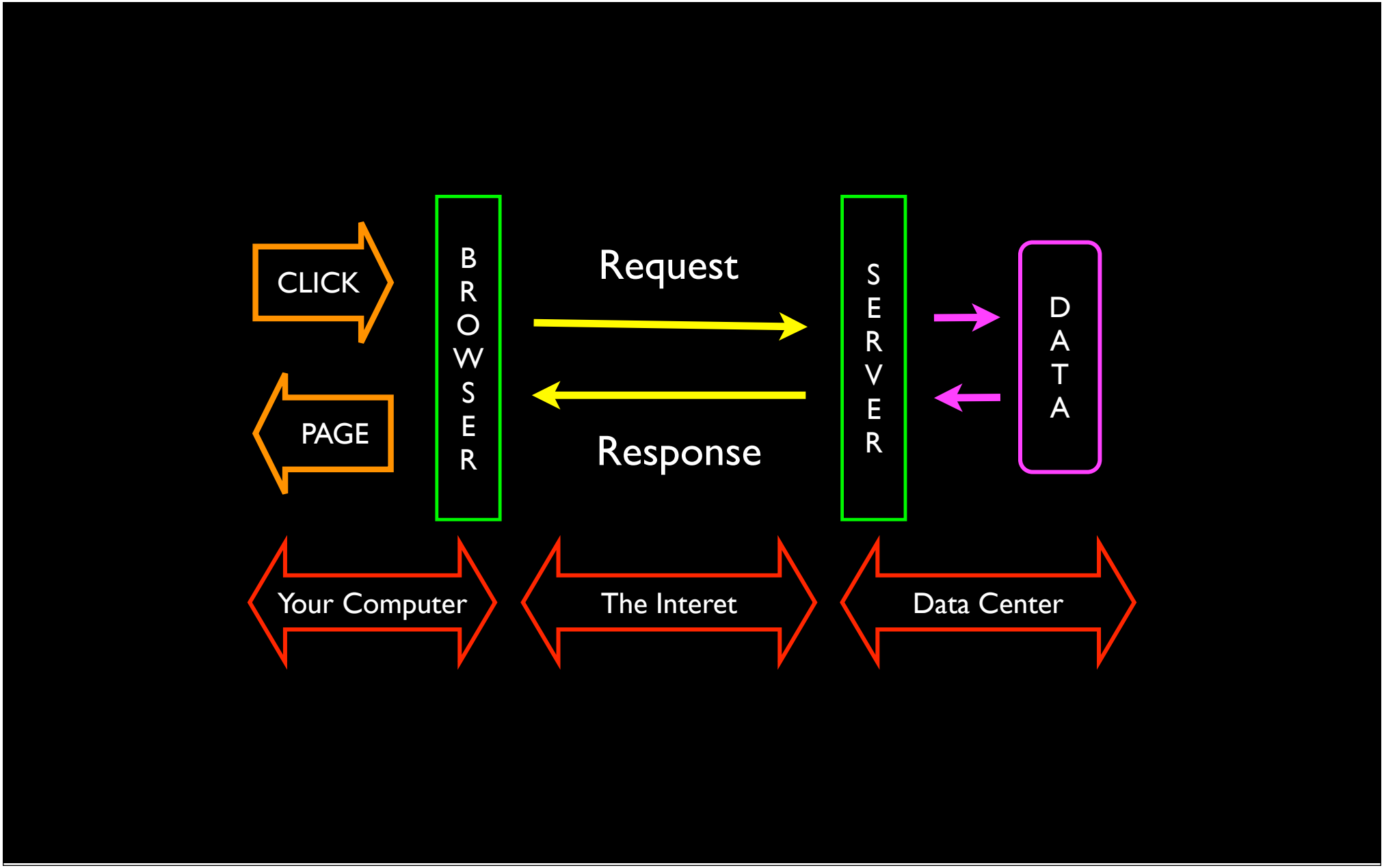
Web Applications

http://en.wikipedia.org/wiki/HTTP


Google
http://www.google.com/webhp?rls=ig
python histo
Web Images Maps News Shopping Gmail more ▼
iGoogle | Sign in
Google™
app engine
Google Search
I'm Feeling
Advertising Programs - Business Solu
©2008 - Privacy
app engine - Google Search
http://www.google.com/search?rls=ig&hl=en&q=app+engine
python histo
Web Images Maps News Shopping Gmail more ▼
Sign in
Google
app engine
Search
Advanced Search
Preferences
Web News Blogs
Results 1 - 10 of about 15,000,000 for app engine. (0.10 seconds)
Google App Engine - Google Code
Provides the possibility for developers to host theirs web application on the company's servers.
code.google.com/appengine/ - 13k - Cached - Similar pages
Docs
Getting Started Guide
Download
Google App Engine
FAQ
Articles
Who's using App Engine
Terms
More results from google.com »
What Is Google App Engine? - Google App Engine - Google Code
Google App Engine lets you run your web applications on Google's infrastructure. App Engine applications are easy to build, easy to maintain, ...
code.google.com/appengine/docs/whatisgoogleappengine.html - 32k - Cached - Similar pages
Sponsored Links
Cloud computing
Run apps in your own virtual data center today
www.3tera.com
Application Engines
Found: 321 jobs in your area
Make $15 -$100 / hour with bonuses!
www.localjobsavailable.net


2:47 PM
www.google.com: Google
Home Gmail Calendar Reader More
Google
Search
Web Results 1 - 10 of about 3,620,000 for hiking trails. (0.10
LocalHikes - Hikes and trails near U.S. Metropolitan Areas
See pictures, topo maps, elevation profiles, and ratings for great day hikes and hiking trails near US Metropolitan Areas.
www.localhikes.com/ - 19k - Cached - Similar pages
Where to Hike: Top US Hiking Trails | GORP.com
GORP's Hiking guide offers information and resources on the
T-Mobile
MENU


Internet


CLICK
PAGE
BROWSER
Request
Response
SERVER
DATA
Your Computer
The Interet
Data Center

Internet

HTML JavaScript

AJAX CSS

Cookies

HTTP Request

Response GET

POST

Python Data Store

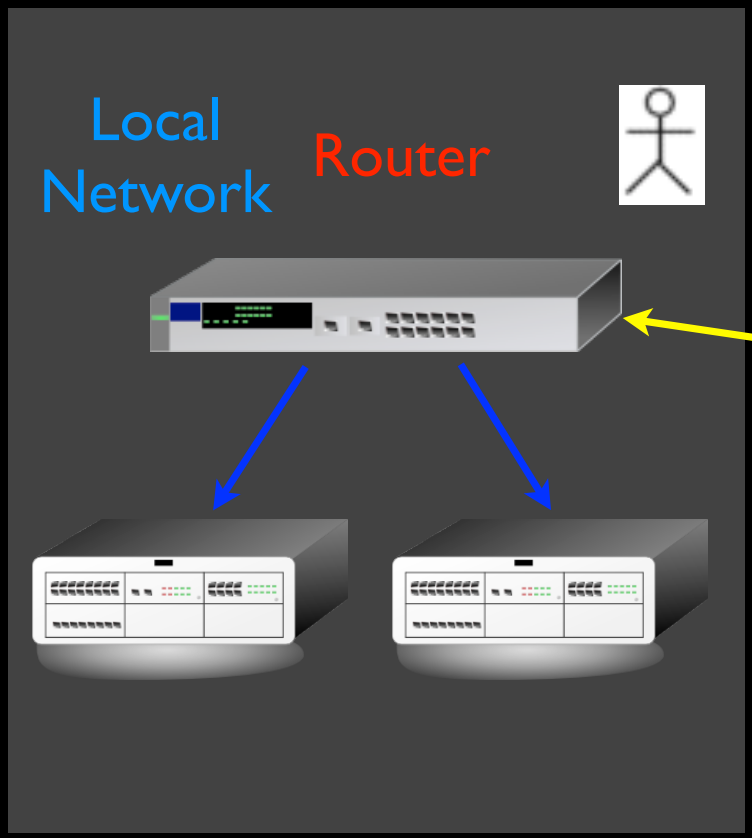
Templates memcache

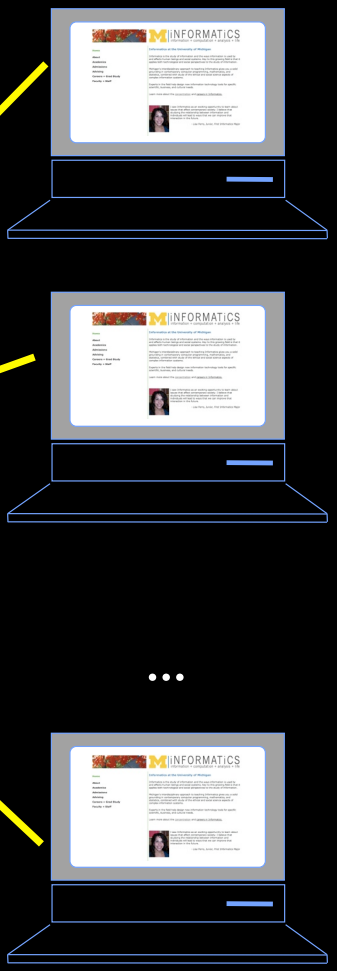
MVC

Cloud Computing

http://en.wikipedia.org/wiki/Cloud_computing

Pre-Cloud View

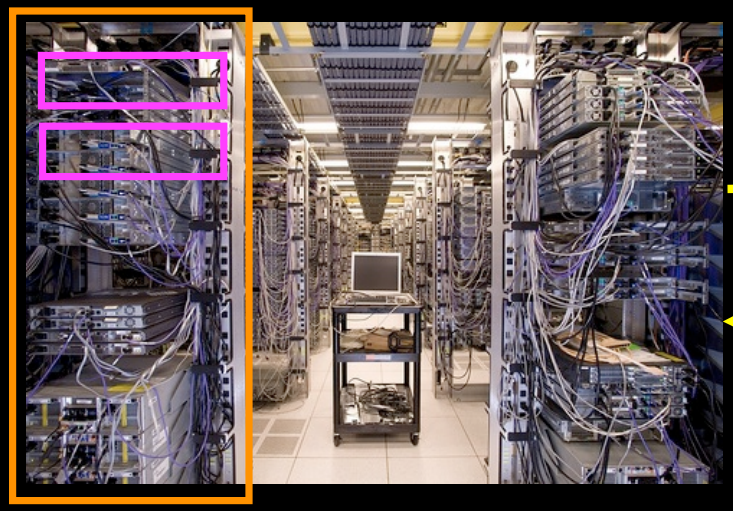


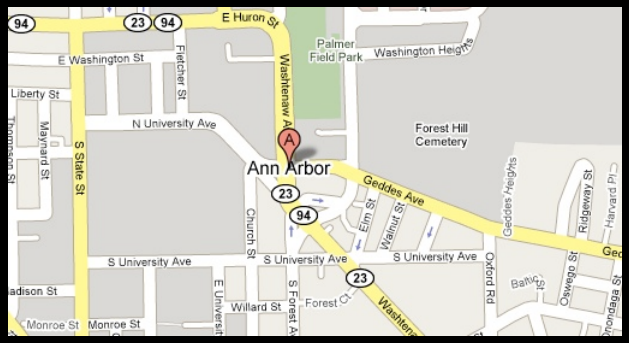


ctools.umich.edu

Hardware

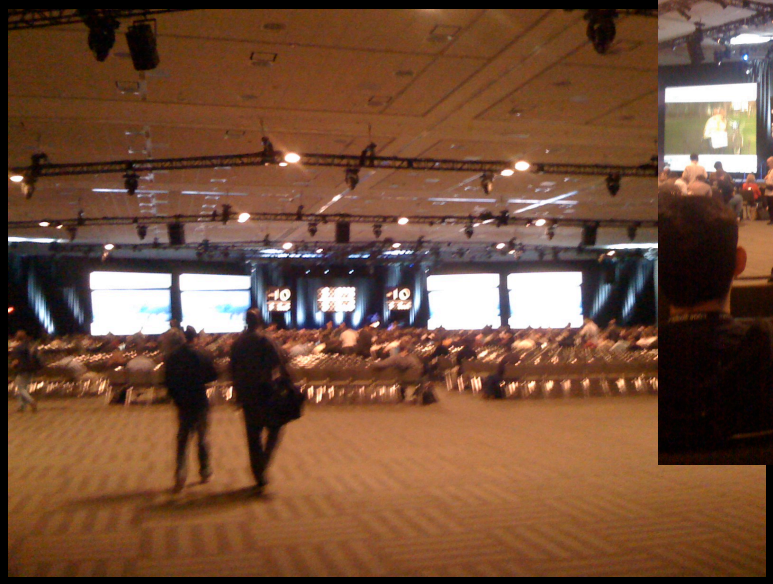
Software

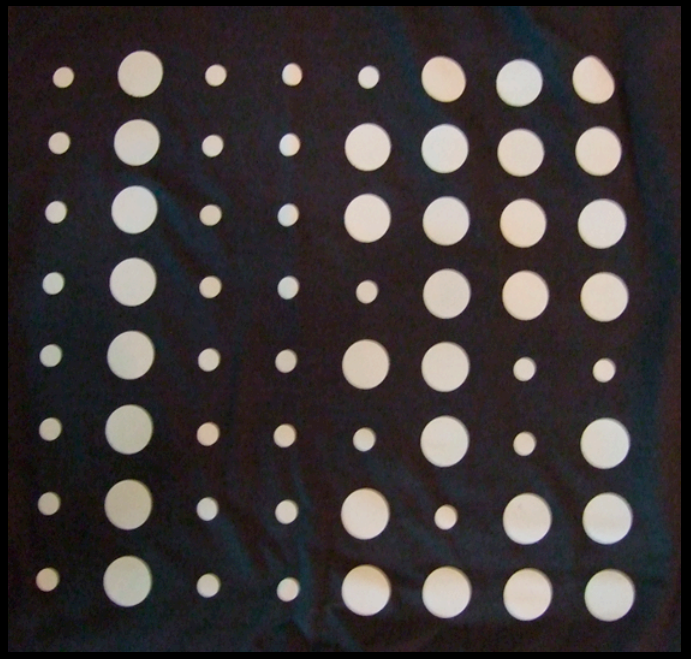




In a pre-cloud view servers have a geographic location and we use the Internet to exchange data with those servers.

Google I/O 2008





Google I/O 2008 Keynote

- Google I/O '08 Keynote by Marissa Mayer
- Usablity / User Experience / User Testing / Architecture / Philosophy

http://www.youtube.com/watch?v=6x0cAzQ7PVs

http://www.youtube.com/watch?v=6x0cAzQ7PVs

Lessons

- The cloud is wide - we can touch 1000 servers in 0.1 seconds
- For things that seem "intelligent" 0.2 seconds is fast enough - as long as you can do a lot of them
- Lots of spread-out storage and a fast scan is important
- Data - Information - Knowledge - starts with data and the ability to look through that data quickly

Scalable Infrastructure

http://www.youtube.com/watch?v=zRwPSFpLX8I

Infrastructure

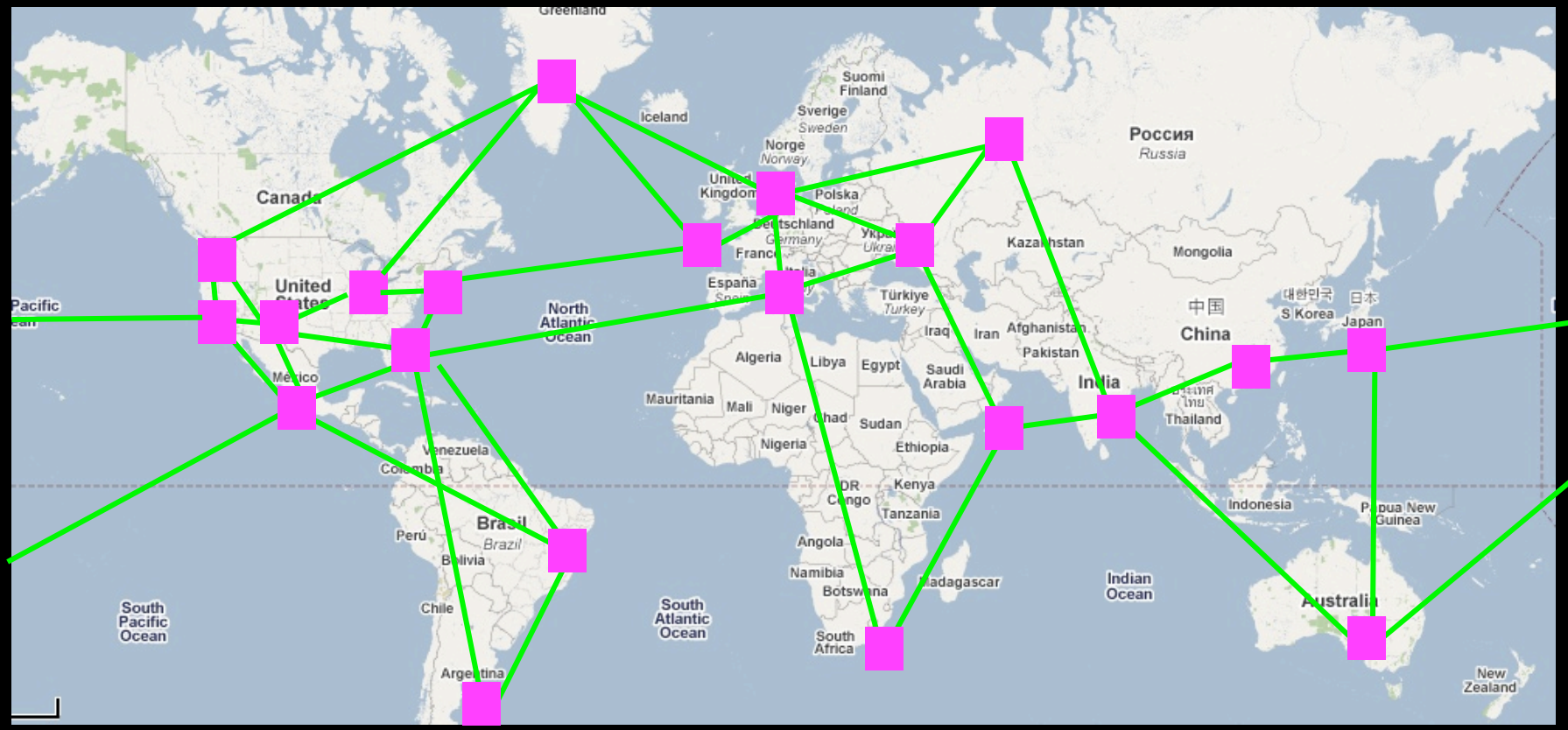
- The only sustainable scalability is when you scale with inexpensive, green solutions
- Tape Backup is a rate limiting factor - so we need something creative
- Disaster recovery - “Of course!”

World-Scale Applications

- For world-scale applications - the servers must be distributed around the world
- But users must see a uniform “single image” - www.google.com
- Also the programmers cannot know the structure or grography of the servers - because this always changes

Google Server Locations

http://royal.pingdom.com/2008/04/11/map-of-all-google-data-center-locations/

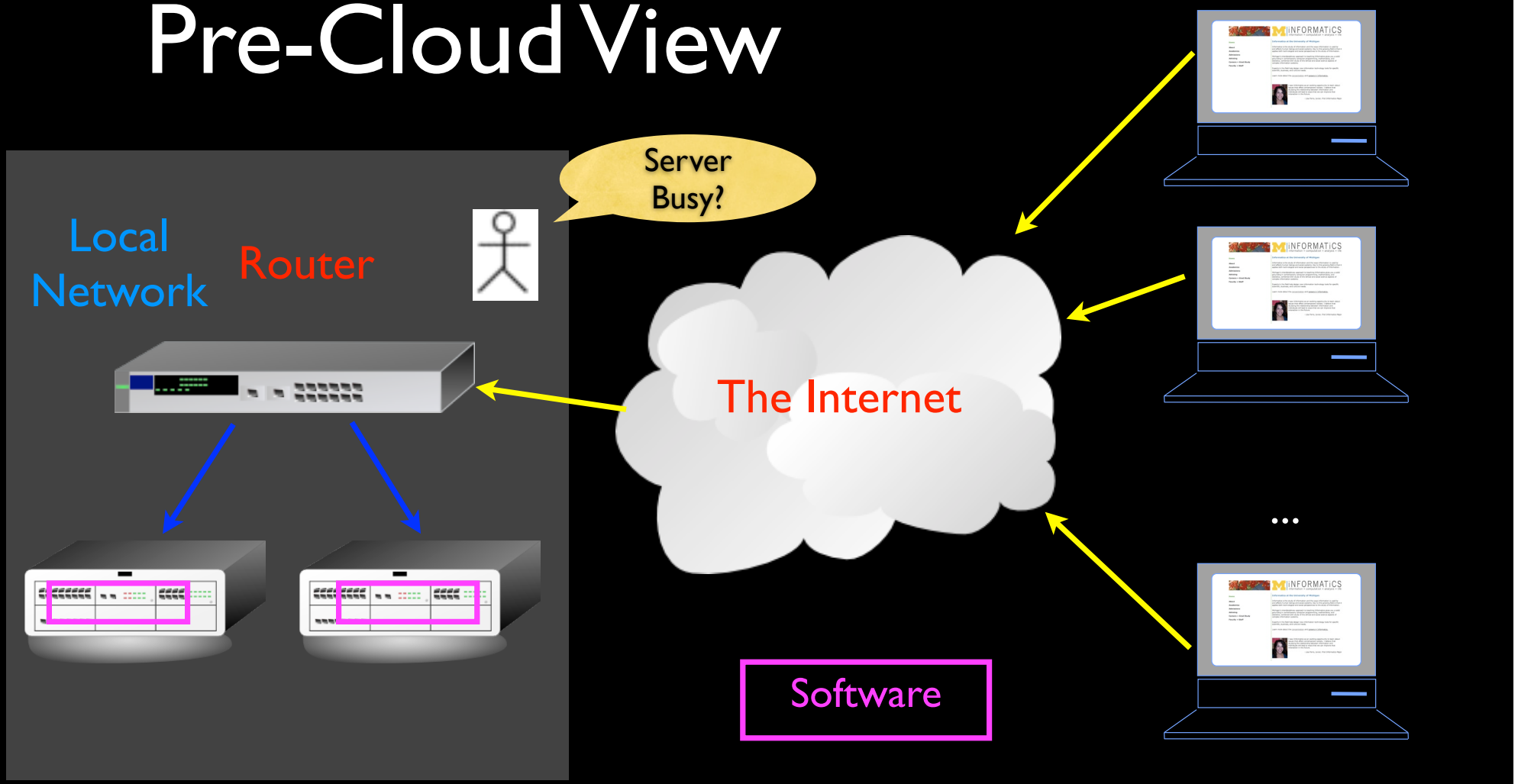

Canada
United States
Pacific
North Atlantic Ocean
Iceland
Suomi Finland
Sverige Sweden
Norge Norway
United Kingdom
Polska
Deutschland Germany
France
España
Россия Russia
Kazakhstan
Mongolia
Türkiye Turkey
Iraq
Iran
Afghanistan
Pakistan
China
S Korea
Japan
India
Thailand
Saudi Arabia
Algeria
Libya
Egypt
Mauritania
Mali
Niger
Chad
Sudan
Nigeria
Ethiopia
Kenya
Tanzania
Angola
Namibia
Botswana
South Africa
Madagascar
Indian Ocean
Indonesia
Papua New Guinea
Australia
New Zealand
México
Venezuela
Colombia
Brasil Brazil
Perú
Bolivia
Chile
Argentina
South Pacific Ocean
South Atlantic Ocean

Programming in the Cloud

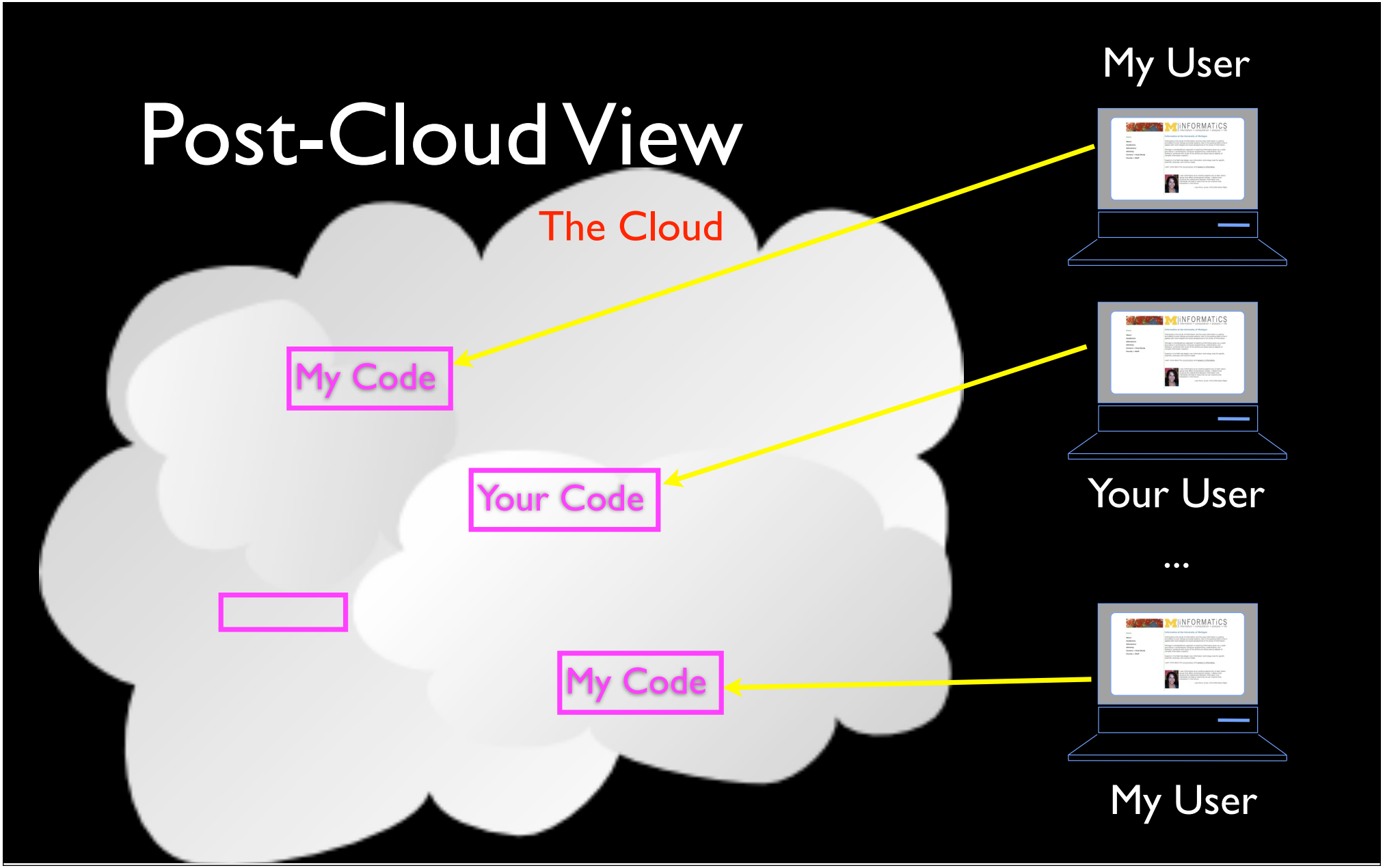
- Programmers operate in a controlled environment
  - Programs do their programming thing - code + data
  - A complex software framework manages getting the right code and data to/from the right servers.
- Software developers are unaware of geography

Resources can be dynamically adjusted as load changes.

Pre-Cloud View



Post-Cloud View



HTTP - Request / Response

- The nature of the HTTP Request/Response cycle makes the cloud possible
- Since clients are not connected for very long - the cloud can be changed in between requests
- As long as the cloud "fakes" everything about the protocol - no one is the wiser..
- The cloud engineers at Google/Amazon/Yahoo are pretty clever.

HTTP Request / Response Cycle

Web Server

HTTP Request

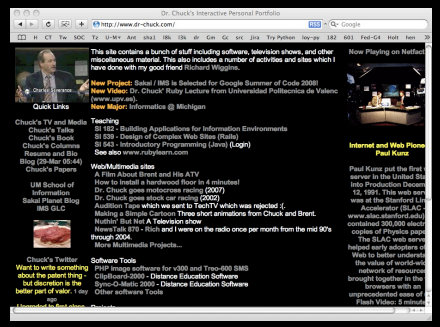
HTTP Response

Browser

Hello there my name is Chuck.

Go ahead and click on here.

Internet Explorer, FireFox, Safari, etc.



http://www.oreilly.com/openbook/cgi/ch04_02.html

HTTP Request / Response Cycle

Web Server

GET /index.html

HTTP Request

HTTP Response

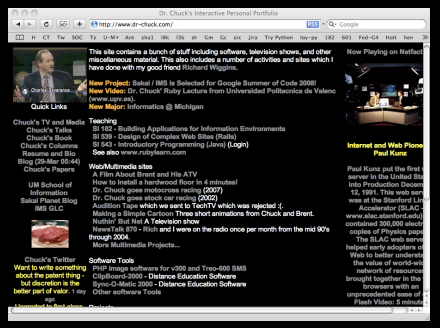
```
<head> .. </head>
<body>
<h1>Welcome to my
  application</h1>
....
</body>
```

Browser

Hello there my name is Chuck.

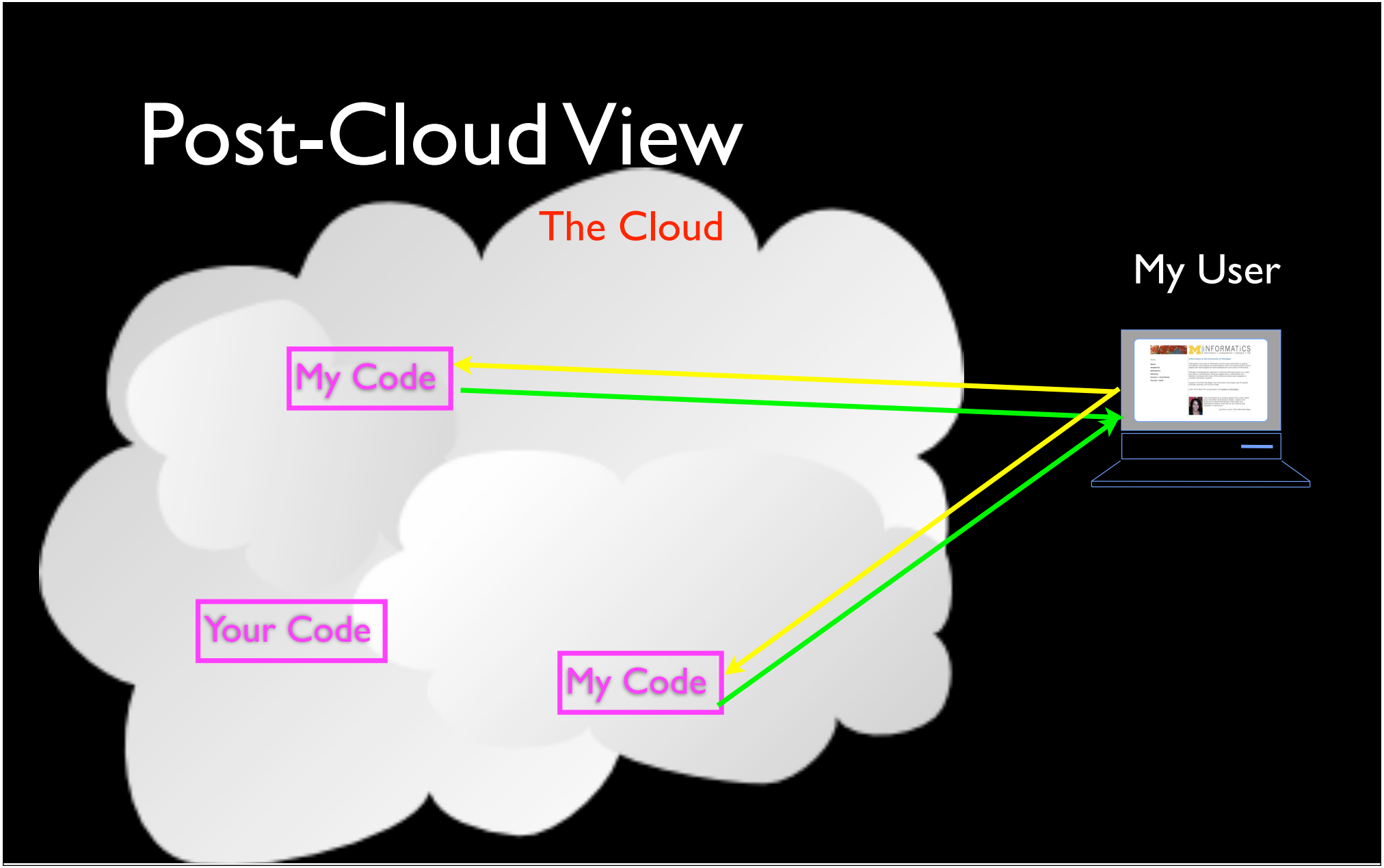
Go ahead and click on here.

Internet Explorer,
FireFox, Safari, etc.

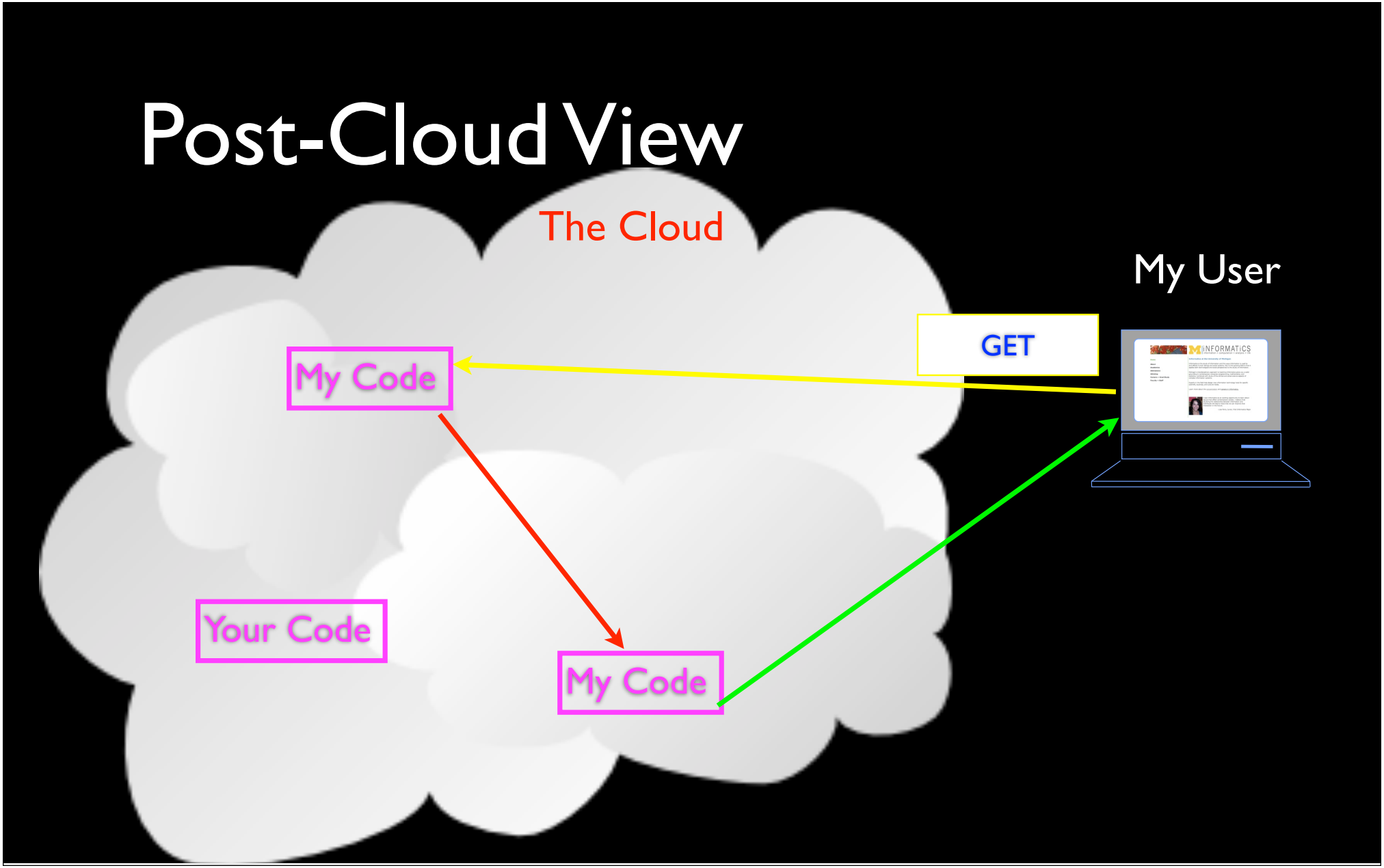


http://www.oreilly.com/openbook/cgi/ch04_02.html

Post-Cloud View



Post-Cloud View



Cloud Summary

- The cloud is the Internet plus computing that is "embedded" "inside" the network
- Companies like Google, Amazon, and Yahoo put servers all over the world
- Software runs on whichever server is most appropriate and data/code is moved around and the cloud can be reconfigured dynamically

Google App Engine

Google App Engine

- Expose Google's worldwide Infrastructure to us as developers

Campfire One: Introducing Google App Engine (pt. 1)

http://www.youtube.com/watch?v=3Ztr-HhWX1c
http://www.youtube.com/watch?v=oTFL7FPLnXY

5:20

Google App Engine

- When you write a Google Application Engine Application - you are running in the Google Cloud
- Just like you were a Google Developer
- You don't know where you are running or if one copy of a thousand copies of you are running
- Google hosts small applications for *free* - larger applications pay by usage

Free Accounts

- A free account can use up to 500MB of persistent storage and enough CPU and bandwidth for about 5 million page views a month.

Quota	Limit
Apps per Developer	10
Storage per App	500MB
Files per App	1,000
Size per File	1MB

Quota	Limit
Emails per Day	2,000
Bandwidth In per Day	10,000 MB
Bandwidth Out per Day	10,000 MB
CPU Megacycles per Day	200,000,000
HTTP Requests per Day	650,000
Datastore API Calls per Day	2,500,000
URLFetch API Calls per Day	160,000

Why is App Engine Free?

- Make the web better
- Be the first widely used “cloud” envionment - beat Amazon, Microsoft, and Yahoo!

Summary

- We introduced Cloud Computing - servers move "into" the network cloud
- Google App Engine allows us to use the Google Cloud for free
- To make use of this resource we need to "learn the rules of the road"